Castilleja linariifolia

Castilleja

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Laramie Columbine Oratory

Bonnie Heidel
Wyoming Natural Diversity Database (WYNDD)

If plants could talk…! Wyoming Native Plant Society will be in hot pursuit of Laramie columbine (*Aquilegia laramiensis*) glimpses and tales at the 2020 Annual Meeting in Laramie (see p. 3, this issue)[1]. Laramie columbine is one of 36 known state endemics *(Castilleja* 38(4)), found only in more northern parts of the Laramie range, restricted to a geological subset of granite outcrops.

An ace Wyoming botanist and botanically-inclined rock climber assembled the most complete picture of Laramie columbine distribution by installments, between 2003-2009, building on specimen and site-specific data to document its known distribution on three sets of public lands (Marriott and Horning 2004a, 2004b, 2010), even relocating a population that hadn't been seen since Aven Nelson collected it there in 1900. However, just when you think you have a clear picture of a species' status, that picture can go up in smoke. In 2012, intense wildfires burned northern Laramie Range landscapes spanning about 32% of known populations.

In theory, a rock-dwelling plant isn't affected by fire –- right? Laramie columbine was known from 54 places, but almost none have had populations as large as 50 plants. A study was launched to evaluate the effects of fire on Laramie columbine, comparing 2014 tallies with estimates made in 2003 and 2004 surveys. Vegetation samples were also conducted to record woody plant mortality and associated canopy cover, and to document understory composition with special attention to any non-natives. Botanist Jill Welborn conducted most of the fieldwork (Heidel and Welborn 2015).

We determined that the species is resilient to fire, surviving at all burned sites except for one small population that was buried in a recent rockslide.

(Continued p. 9)

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[1] Laramie columbine, and its specific population at Friend Park below Laramie Peak, has been a destination of Wyoming Native Plant Society (WYNPS) in the past. An Audubon hike there was led by Walt Fertig, WYNDD botanist in 2000. When the 2004 WYNPS fieldtrip targeted the same place, roads proved impassable after torrential rain. Robert Dorn, intrepid hike leader, "pulled an alternative location out of his sleeve" from work he had done years earlier, providing WYNPS members a substitute place for exciting glimpses.

WYNPS News

2020 Annual Meeting: Mark your calendar for Laramie-based 2020 annual meeting, June 26-28. See the events information in this issue, look for a registration form in the May issue or check the WYNPS homepage later for online registration.

New members: Please welcome the following new members to WYNPS: Steve Deutsch, Jackson; Brent Ewers, Laramie; Kathleen Julien, Cody; McClain Parker, Jumul, CA; Lee Riddell, Jackson; Kristen Smith, Kemmerer; Sienna Wessel, Laramie.

2020 Renewal: Are you a person of 2020 hindsight or foresight? If your mailing address label has "2019" on it, whether you are reactive or proactive, please consider renewing now!

WYNPS Board – 2020
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If you have plant hikes that you'd like to announce in the next newsletter, please send them by 15 April.

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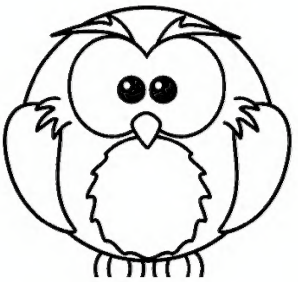
Teton Plants: Amy Taylor, Treasurer; (tetonplants@gmail.com). See March talks, p. 6 and check the chapter homepage (https://tetonplants.org/)

Contributors to this Issue: Robert Dorn, Katy Duffy, Bonnie Heidel, Dorothy Tuthill.

Treasurer's Report: Balance as of 26 Feb 2020: Scholarship=$951; General=$8283; Total= $9234.

Message from the President:



March Greetings!

As I write this message, I'm feeling very grateful and here's why: I thank Paige Wolken for completing her term as an important member of the Wyoming Native Plant Society Board! I extend a hearty welcome to Emma Freeland, new member of the Board! My thanks to returning officers Vice-President Lynn Stewart, Secretary-Treasurer Dorothy Tuthill and ongoing Board member Katie Haynes for all they contribute to the WYNPS! And a huge thank you to newsletter editor Bonnie Heidel for always producing creative, engaging and informative newsletters and to webmaster Dorothy Tuthill for maintaining the WYNPS website so that it is always appealing and up to date! Thanks also to every member of the WYNPS for your support!

I'm also grateful for a snowy winter in northwestern Wyoming, my corner of the state, and it's not just because I love to cross-country ski. Although temperatures have been warmer than usual this winter, a deep blanket of snow tells me that native plants will have plenty of nourishing moisture. Because of my concerns about climate change, I breathe at least a temporary sigh of relief as snowpack deepens. Winter drives Greater Yellowstone, the ecosystem I call home. It's why plants here have myriad adaptations for surviving harsh winters and it's why there are lavish displays of native wildflowers each summer in the Tetons, the Beartooths, the Absarokas and the Gallatins.

As you experience late winter and witness how it influences your landscape, I hope this includes awareness and appreciation of native plants and how the wildness of Wyoming preserves habitats for native species and natural systems.

Katy Duffy

Next Issue: Please send articles, ideas and announcements for the next issue by 15 April.

Wyoming Native Plant Society
P.O. Box 2449
Laramie, WY 82073

2020 Wyoming Native Plant Society Annual Meeting, June 26-28; *Have you heard of Laradise?!*

This year we return to the Laramie, exploring from basin to alpine. We'll also tour the Rocky Mountain Herbarium to see the largest collection of Rocky Mountain plants in the world! And, University of Wyoming botanists will share some insights on how plants survive the harsh conditions of Wyoming. Tour options include several state and regional endemics: Laramie columbine (*Aquilegia laramiensis*), Laramie false Sage (*Artemisia simplex*; formerly *Sphaeromeria simplex*), Whiproot wind clover (*Trifolium dasyphyllum* var. *anemophilum*), and White larchleaf penstemon (*Penstemon laricifolius* var. *exilifolius*).

Camping: Yellow Pine USFS Campground. $10/night/site. Conveniently located only a few miles east of Laramie in the Pole Mountain Unit of the Medicine Bow NF, Yellow Pine CG has 19 sites and pit toilets. There is no potable water at Yellow Pine—the closest water is available at the Lincoln Monument, approximately 3 miles from the campground. We will attempt to save some sites at Yellow Pine. Other campgrounds include Tie City and Vedauwoo (also $10, also no water) and the KOA in town.

Lodging: There are many options for lodging in Laramie!

Note on parking near campus: Parking should not be difficult on a summer weekend. However, some street parking requires a city parking permit—watch for signs indicating those blocks! The fine for parking there without a permit is steep--$50.

Friday June 26

Check in: 12-3:30 pm, Yellow Pine Campground

4-7 pm, Rocky Mountain Herbarium, open house with light refreshments

6:00 pm Tour of the Herbarium

7:30 pm Evening stroll at a valley overlook, on our way back to Yellow Pine campground

LOOK FOR REGISTRATION, MAPS AND MORE DETAILS IN THE MAY NEWSLETTER, AND EARLIER ONLINE POSTING

Saturday June 27

Trips will leave from the parking lot by Planet Fitness, 654 N. Third St. (This is the same shopping center as Safeway.) Park at the north end of the lot. Please plan to carpool as much as possible—your car will be safe in this lot all day.

Hikes:

1. Laramie Peak
   Head north for a long day of botanizing to Laramie columbine at Friend Park (Laramie Peak area), with many options for returntrip stops to see endemics along the way. Roundtrip ca. 250 miles!

   Leader: Bonnie Heidel

2. Snowy Range
   Travel west from Laramie to the Snowy Range of the Medicine Bow Mountains. Highway 130 is one of the most scenic roads in the country, reaching an elevation of 10,500 ft. Short walks (or crawls) from our vehicles will deliver us to outstanding subalpine floral displays, including a miniature cushion plant community. Exact destinations will be determined by snowmelt.

   Leader: Ernie Nelson

Saturday evening dinner and presentation: 6 pm Berry Biodiversity Conservation Center, 10th and Lewis Sts., University of Wyoming campus. Catered dinner. Sorry, but no alcohol is allowed.

Presentation by Dr. Brent Ewers, Department of Botany, will begin at 7 pm.

Sunday June 28 – TWO HIKES TO BE ANNOUNCED

New Plant Acronyms on Federal Lands

(*Botanists are often posed with the question "what good is it?" Every now and then, an acronym congeals a concept and lends legitimacy to abstract thinking by utilitarian standards. A recent article in the Natural Areas Journal (Khoury et al. 2020) with its acronyms and national perspective offers a new view of botanical diversity on our federal lands.*)

Two sister agencies within the USDA, the U.S. Forest Service (USFS) and the Agricultural Research Service (ARS), joined forces to conserve crop wild relatives in the United States and bridge the associated technical divide between wild and cultivated resources. Their pact was posted a few years ago (USDA 2014). The stage was set for this pact by the first national inventory of **Crop Wild Relatives** (CWRs) (Khoury et al. 2013) (https://www.fs.fed.us/wildflowers/ethnobotany/documents/cwr/FrameworkNativeCropWildRelativesOct2014.pdf. The CWR inventory included not only progenitors of agricultural crops, but also wild relatives, many other **Wild Utilized Species** (WUS) - including cultural plant resources (CPRs!), and a few weedy relatives of crop plants as naturalized (non-native) species selected by their New World environs.

In total, 3912 species were recognized as CWRs spanning 985 genera and 194 plant families. Authors concluded: "Far from possessing few genetic resources, the United States contains a wealth of native and introduced plants related to a broad range of crops".

CWR inventory results were compared against the National Plant Germplasm System inventory to determine that there are significant gaps in the *ex situ* collections of these taxa that remain(ed) to be filled. In ensuing years, a road map route was laid out for the conservation, use, and public engagement around North America's crop wild relatives and wild use plants (Khoury et al. 2019). Both studies entailed deep dives into the taxonomic and floristic literature, while their resulting publications appeared in Crop Science, a decidedly non-taxonomic, non-floristic and non-biodiversity venue.

This all changed in 2020 when conservation of CWR species was featured as in the Natural Areas Journal (Khoury 2020), showcasing the collaborative conservation of native CWRs as a sister act successfully navigating the "road map" for wild cranberries (*Vaccinium macrocarpon*) and chile pepper (*Capisicum annuum* var. *glabriusculum*) from opposite ends of the country.

The road map has critical junctures:
1. Understanding and documenting North America's CWRs and WUSs
2. Protecting threatened species in their natural habitats,
3. Collecting and conserving ex situ the diversity of prioritized species,
4. Making this diversity accessible and attractive for plant breeding, research, and education,
5. Raising public awareness of their value and the threats to their persistence.

The U.S. Forest Service posting about CWRs is at: www.fs.fed.us/wildflowers/ethnobotany/wildrelatives.shtml and prominently features a widely-recognized wild species: wild strawberry.

...For a link to traditional food initiatives of Shoshone tribe, go to: , https://restoring-shoshone-ancestral-food.org/, [See p. 5, Literature Cited]

GOING WILD over food security

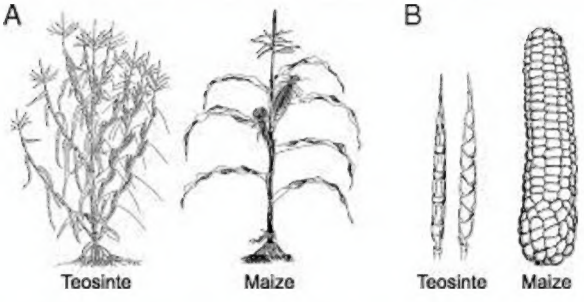


FIGURE 1.-Mexican annual teosinte and maize plant architectures. Adapted from ILTIS (1983) Illustration from: Yang, C.J., L.F. Samayoa, P.J. Bradbury, B.A. Olukolu, W. Xue, A.M. York, M.R. Tuholski, W. Wang, L.L. Daskalska, M.A. Neumeyer, J. Sanchez-Gonzalez, M.C Romay, J.C. Glaubitz, Q. Sun, E.S. Buckler, J. B. Holland, and J.F. Doebley. PNAS March 19, 2019 116 (12) 5643-5652; first published March 6.

Hugh Iltis was a pioneer in "going wild" to seek out the progenitors and wild relatives of cultivated crop plants to breed resilience into them. He is most widely recognized as scientist for his role in the discovery of perennial teosinte (*Zea diploperennis*), a wild diploid relative of modern ***maize*** (*Zea mays*) native to Mexico, as singular source of ***genetic*** resistance to various ***corn*** viruses and ***corn*** rust. His work, now enshrined in textbooks, might be misinterpreted that the only genetic resources of agricultural significance are at lower latitudes than our own.

Literature Cited
Khoury, C.K., S Greene, J. Wiersema, N. Maxted, A. Jarvis, and P. C. Struik. 2013. An inventory or crop wild relatives of the United States. Crop Science 53: 1496-1508.
Khoury, C.K., S.J. Green, T. Moureau, S. Krishnan, and A.J. Miller. 2019. A road map for conservation, use, and public engagement around crop wild relatives and wild utilized plants of North America. Crop Science 59:1-6.
Khoury, C. K., S. L. Greene, S. Krishnan, A. J. Miller, T. Moreau. K. A. Williams, L. Rodriguiex-Bonilla, C.S. Spurrier, J. Zalapa and G. P. Nabhan. 2020. Toward integrated conservation of North America's crop wild relatives. Natural Areas Journal 40(1):96-100.
U.S.D.A. Forest Service and USDA Agricultural Research Service. 2014. Joint strategic framework on the conservation and use of native crop wild relatives in the United States. FS-1029. Washington, D.C.

Additions to the Flora

Two native species additions to the Wyoming flora were documented from opposite ends of the state. Vouchers have been submitted to RM.

Slickseed fuzzybean (*Strophostyles leiosperma*) is an annual of the Great Plains discovered above the Laramie River (*Dorn 12325* RM) in Fort Laramie National Historic Site, Goshen County, WY. It marks a new genus added to the 25 genera in the Bean Family (Fabaceae) in Wyoming (Dorn 2001, Nelson 2018). It is distinctive in having a vine-like growth form. It also has two different kinds of leaves that include simple leaves on the lower stem – but these may wither before flowering - and pinnately-trifoliate leaves on the upper stem. The addition was made as an extension of floristic work at the Site that included efforts to document late-season plants. Robert Dorn's 2019 collection of *Strophostyles leiosperma* was made in September, on Friday the 13th, after he had almost put away his plant presses for the season. Nearest records, according to PLANTS database, are in Scotts Bluff County, Nebraska and Weld County, Colorado.

Inundated clubmoss (*Lycopodiella inundata*) is a northern denizen discovered in a fen of Caribou-Targhee National Forest, Teton County, WY (*Heidel 4832* RM). There, it is at the southern end of its extent in the Rocky Mountains, though its distribution reaches farther south in the Appalachians and in California. This adds a fourth genus to the Clubmoss Family (Lycopodiaceae) in Wyoming (Dorn 2001, Nelson 2018). Like most other clubmosses in Wyoming, it has horizontal stems. Unlike them, it has spreading sporophylls, superficially resembling a species of spikemoss, *Selaginella selaginoides*. The addition was made as part of a study at select fens in two national forests (Heidel 2019). Nearest records are in Yellowstone National Park, only from that part of the Park in Fremont County, Idaho (Jennifer Whipple pers. commun.). One non-native species is also added:

One-seeded hawthorne (*Crataegus monogyna* var. *monogyna*) is a tall shrub in riparian habitat of F.E. Warren Air Force Base. Its deeply incised leaves differ from everything else in the state. It was a "mystery twig" for years, never found in fruit, …until 2019 (*Heidel 4958* RM). It was introduced early to North America for agricultural hedges; cultivated varieties of it are still widely grown as ornamentals (Phipps 2014). It has a distribution along the East Coast extending to the Great Lakes, and along the West Coast, with only one collection in the inland West reported from Colorado (Phipps 2014). It might have been introduced to Wyoming if it was planted at fort headquarters and escaped, or it might have been introduced directly by horses if they ate it and brought its seeds to the Base during its early years as a cavalry post. There have only been a couple individual plants noted to date, over a mile apart, showing no signs of spreading. This determination was made possible with help of B.E. Nelson and J.B. Phipps.

This thorny mystery twig hung over the desk for years, reminder to seek it in flower or fruit.

Literature Cited
Dorn, R. D. 2001. Vascular Plants of Wyoming, third edition. Mountain West Publishing, Cheyenne, WY.
Heidel, B. 2019. Botany inventories in fens of the Caribou-Targhee and Bridger-Teton National Forests. Report prepared for the USDA Forest Service – Region 4 by the Wyoming Natural Diversity Database - University of Wyoming, Laramie, Wyoming. http://www.uwyo.edu/wyndd/_files/docs/reports/wynddreports/u19hei01wyus.pdf
Nelson, B.E. 2018. Checklist of the Wyoming flora following nomenclature of the Rocky Mountain Herbarium. Posted online at: https://www.uwyo.edu/botany/rocky-mountain-herbarium/ .
Phipps, J. B. 2014. *Crataegus*. Pages 491-643. in Flora of North America Editorial Committee, editor. Flora of North America North of Mexico. Vol. 9. Magnoliophyta: Picramiaceae to Rosaceae. Oxford University Press, New York, NY.

MARCH EVENTS

Teton Plants, a Chapter of Wyoming Native Plant Society, co-hosts weekly natural history talks in winter at the Teton County Public Library. The March lineup is:

Tue., March 3, 6-8 p.m. - "Flood plain dynamics along rivers in the western USA & related conservation issues" – Mike Merigliano, hydrologist and ecologist.

Tue., March 10 – 6-8 p.m. - "Toads, Water Management & Beavers" - Deb Patla
Toads and other amphibians are a crucial but overlooked component of our Valley's ecosystem. Herpetologist Deb Patla will discuss the 2019 survey of toads in GTNP and NER and the impacts of management of the Snake River and Jackson Lake and the disappearance of the beaver.

Tue., March 17 – 6-8 p.m. "Cenozoic tectonic-climate evolution of western US" - Daniel Enrique Ibarra, Stanford University - Geologists of JH

Tue., March 31, 6-8 p.m. - "Improving Native Plant Restoration with a Pasta Machine" – Maggie Eshleman, Restoration Scientist, The Nature Conservancy, Lander. Teton Plants
The running calendar of Teton Plants talks, hikes and more is posted at their homepage:
https://tetonplants.org/

Black Hills Area Botany & Ecology Workshop
March 20, 2020

Agency and academia botanists and ecologists convene every year in the Black Hills. This year's is at Outdoor Campus West of South Dakota Game, Fish & Park, 4130 Adventure Trail, Rapid City.
(There is no advance registration or fee to register.)
8:00 – 8:30 Registration and Coffee
8:30 Welcome

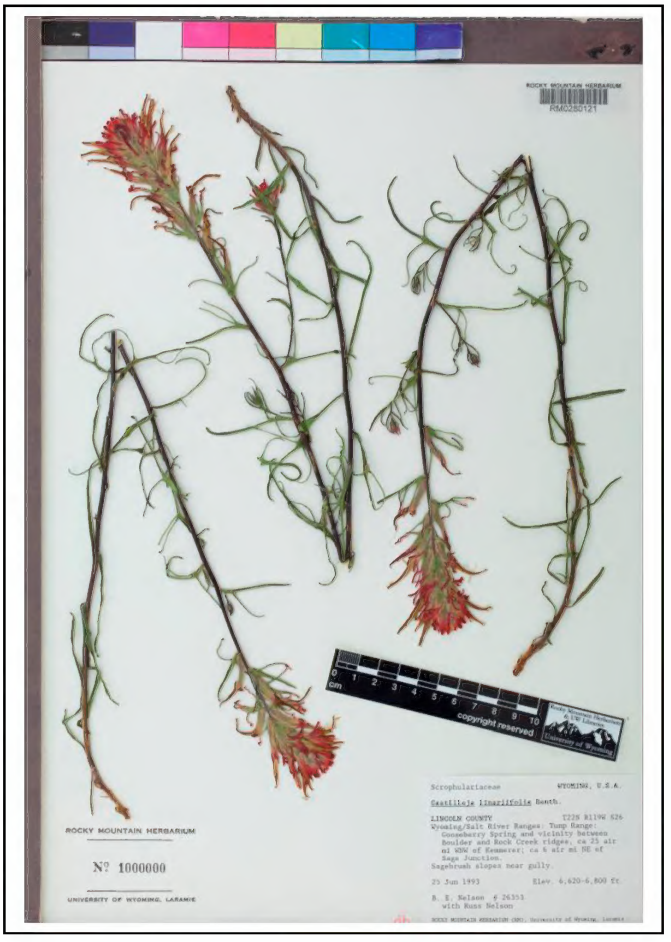
Contributed Talks Session 8:35-10:05
Integrating structure metrics into burn severity mapping
Prescribed fall and spring fire effects on annual brome and native vegetation in northern mixed grass prairie and sagebrush steppe
Limber pine restoration in South Dakota
Morphometrics and trait segregation in a native thistle hybrid zone (Thunder Basin, Wyoming)
10:05 – 10:20 Break
Sweetclover Symposium 10:20-12:10
Yellow sweetclover – Biology and invasion history of the Great Plains
Patterns of yellow sweetclover abundance in Northern Great Plains National Park Units 2011-2019
Managing yellow sweetclover to minimize its impacts in Dakota rangelands
Sweetclover – Nuisance weed or missed opportunity? A rancher's perspective
Sweetclover at the bee buffet
World Café with a Twist 1:30-3:15
Contributed Talks Session 2 3:15-4:35
The curious case of 2019: A year of extremes in the Black Hills
Evaluating genetic health of *Bison* on the Pine Ridge Reservation, SD
What are the Badlands bison eating?
Black Hills fens

APRIL EVENT:
Rocky Mountain Herbarium Millionth Milestone

The millionth specimen at Rocky Mountain Herbarium (RM) was mounted in front of a standing-room-only crowd in the RM Prep Room on January 24, 2020. An encore celebration for everyone will be held **April 24** at the University of Wyoming as part of the RM Speaker series (this time with seating!). Guest speaker Dr. Emily Meineke, UC Davis, will talk about "**Herbarium specimens for untangling the history of interactions**" (see below). Meineke is an entomologist interested in changes in insect herbivory over time, as recorded on herbarium specimens. The event will be held at 5:30 **pm** at the **Berry Conservation Biology Building**, co-hosted with the Biodiversity Institute, and followed by a reception.

RM is the largest collection of Wyoming and Rocky Mountain plants in the world and is second only to New York Botanic Garden worldwide in the number of specimens available online. It is the largest facility of its kind between St. Louis and the West Coast. Recently released annual statistics rank RM as:

- 56th largest in the world (among all 3,324 herbaria),
- 14th largest in the United States, and
- the fifth largest herbarium at a public U.S. university.



Above: The millionth RM specimen is a *Castileja linearifolia* collection (*Nelson 26353* RM) and it can be viewed online at the RM homepage (https://www.uwyo.edu/botany/rocky-mountain-herbarium/) by entering "1000000" in the accession number query. It has been beautifully framed for display at RM, the ONLY prepared RM specimen that is not destined for herbarium cabinets.

Big-picture Biology needs Herbarium Specimens

Insects have been eating plants for nearly 400 million years and these interactions have given rise to much of macroscopic diversity. Over the past 12,000 years or so, humans have altered these relationships by domesticating plants and moving them beyond their natural ranges, spraying pesticides, building cities, and changing the global climate. Long-term effects of global change on plant-herbivore interactions are of critical importance to ecosystem functioning and the provision of ecosystem services. However, the effects of global change on these and other species interactions are understudied because longitudinal data spanning the period of anthropogenic environmental change are sparse. Meineke will present novel methods for determining how interactions between plants and insect herbivores have shifted with global change – using herbarium specimens.

Growing Native Plants

Part 35. More Rock Garden Plants

By Robert Dorn

Erigeron compositus, Fernleaf Fleabane, is a loosely matted perennial to 10 inches tall and wide but usually much less. The leaves are mostly basal and dissected and to 3 inches long. The flower stems are several to many with one flower head per stem, each head to 1 inch across. The rays vary from white to pink or blue. The disk flowers are yellow. The flowers appear from May to July or sometimes into August. The plants occur naturally in moist, gravelly or rocky, open places and in rock crevices in the basins, valleys, and mountains. They prefer full sun and moist, well drained, rocky, gravelly, or sandy soils. It is easy to grow from seed. Surface sow for light exposure. It is in the nursery trade and is easy to transplant.

Erigeron compositus, Goshen County

Musineon tenuifolium, Slenderleaf Musineon, is a tufted perennial to 1 foot tall and nearly as wide but usually shorter. The leaves are all basal, narrow, finely dissected, and to 8 inches long. The flowers are yellow and tiny but tightly clustered in a terminal umbel to 1.5 inches across. They appear in May and June. The plants occur naturally in open or partly wooded areas or in rock crevices mostly on the plains. They prefer dry, sunny or partly shaded, rocky or well drained areas. It can be grown from seed sown outdoors in the fall.

Musineon tenuifolium, Goshen County

Penstemon humilis, Low Penstemon, is a perennial to 10 inches tall often forming loose mats several feet across with many flowering stems. The leaves are opposite and to 2.5 inches long and 1 inch wide. The flowers are blue or blue-violet, to .75 inch long, and in small clusters along the upper part of the stems. They appear in May and June. The plants occur naturally in dry open places of the basins, valleys, and mountains. They prefer full sun and dry, well drained soils. It can be grown from seed sown outdoors in the fall.

Penstemon humilis, Daggett Co., UT

Phlox multiflora, Mountain Phlox, is a perennial forming loose to dense mats to 10 inches across and 4 inches tall. The leaves are opposite, very narrow, and to 1.25 inches long. The flowers are white with sometimes a pink or bluish tinge, to 1 inch across, with 1 to 3 at the ends of short stems, and often completely covering the mat. They appear from May to August depending on elevation. The plants occur naturally in open areas, often with sagebrush, in the higher basins and mountains. They prefer full sun and cool, moist, well drained soils. It can be grown from seed surface sown outdoors in the fall. Seed is commercially available.

Phlox multiflora, Daggett Co., UT

Sedum lanceolatum, Lanceleaf Stonecrop, is a somewhat mat forming perennial to 6 inches tall. The leaves are fleshy, narrow, to 0.5 inch long, and compactly clustered. The flowers are yellow, to 0.5 inch across, star shaped, and clustered at the stem tips. They appear from June to August depending on elevation. The plants occur naturally in dry to moist, open, gravelly or rocky places in the plains, basins, valleys, and mountains. They prefer full sun and dry to moist, well drained soils. It is easy to transplant or grow from rootstock divisions. Fresh seed needs no special treatment except it should be surface sown. It is also in the nursery trade.

Sedum lanceolatum, Carbon Co.

To see the above plants in color, go to the newsletter on the Society website.

Laramie Columbine Oratory, *continued from p. 1*

Trend results suggest net decline of species' numbers in burned settings. Decline was also present at some level in unburned settings so we cannot assume cause-and-effect. There were drought conditions that lead up to the major 2012 fire events. A combination of factors rather than one single factor such as fire may account for overall trends. Most plants appeared healthy despite loss of woody canopy cover and high understory plant density at burn sites, suggesting Laramie columbine can survive fire and compete with other vegetation over the long term.

More recently, American and Austrian researchers have looked to Laramie columbine for evolutionary clues. So …we may hear more from Laramie columbine yet!

Literature Cited, go to p. 10

Literature Cited- Continued from p. 9

Heidel, B. and J. Welborn. 2015. Fire response of *Aquilegia laramiensis* (Laramie columbine) and status report update, southeastern Wyoming. Prepared for the Medicine Bow National Forest and USDI Bureau of Land Management by the Wyoming Natural Diversity Database - University of Wyoming, Laramie, Wyoming.

Marriott, H. and D. Horning. 2004a. Status of Laramie columbine (*Aquilegia laramiensis*) and results of field survey. Unpublished report prepared for the Wyoming Natural Diversity Database, University of Wyoming, and Medicine Bow National Forest, Laramie, WY.

Marriott, H. and D. Horning. 2004b. Field survey for Laramie columbine (*Aquilegia laramiensis*) in the Rawlins Field Office. Unpublished report prepared for the Bureau of Land Management and the Wyoming Natural Diversity Database, Laramie, WY.

Marriott, H. and D. Horning. 2010. Results of field survey and status report update for Laramie columbine (*Aquilegia laramiensis*). Unpublished report prepared for the Wyoming Natural Diversity Database, University of Wyoming, and the Wyoming Bureau of Land Management, Casper Field Office.

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Wyoming Native Plant Society is a non-profit organization established in 1981 to encourage the appreciation and conservation of the native plants and plant communities of Wyoming. The Society promotes education and research through its newsletter, field trips, annual student scholarship and small grants awards. Membership is open to individuals, families, or organizations. To join or renew, please return this form to:

Wyoming Native Plant Society
P.O. Box 2449
Laramie, WY 82073

Name: _____

Address: _____

_____

Email : _____

Check one: [ ] New member [ ] Renewing member

[ ] Renewing members, check here if this is an address change.

[ ] Check here if you prefer to receive the newsletter electronically

Membership

[ ] WYNPS annual membership: $10.00

[ ] WYNPS annual membership + scholarship support: $20.00 ($10.00 for membership and $10.00 for Scholarship fund)

[ ] WYNPS Lifetime membership: $300 ($150 for membership and $150 for Scholarship fund)

[ ] Sublette Chapter annual membership: $5.00

[ ] Teton Plants Chapter annual membership: $5.00

Total enclosed: _____ THANK YOU!

Wyoming Native Plant Society
P.O. Box 2449
Laramie, WY 82073